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ABSTRACT

This paper surveys the various teleconferencing trials in the Open University, and attempts to analyze why they have been relatively unsuccessful compared to other new media initiatives such as audio cassettes and computer assisted learning. The situation is placed in the context of British and European educational use of telecommunications in education and training. Three areas of teleconferencing that have been used or are being considered at the Open University are discussed: (1) audio-conferencing via telephone is discussed in terms of technical, cost, and educational factors; (2) a discussion of the trials of Cyclops, an experimental audio-graphic conferencing system which transmits handwriting over telephone lines (telewriting), focuses on costs, technical factors, and student response to the tutorials presented via the system; and (3) the potential for use of a sophisticated electronic mail system and/or viewdata system for computer conferencing is considered. It is noted that there is very little use of teleconferencing in British education, and it is suggested that reasons for this include cultural factors, cost of communications, organizational problems, and geographical and time factors. European perspectives are briefly reviewed as they relate to the British experience, and a discussion of future perspectives includes scenarios for the years 1992 and 2000. It is concluded that the organizations most likely to use new telecommunications technology are those with a training rather than an educational brief, who are prepared to concentrate on training at the workplace rather than at home. A 24-item reference list concludes this report. (DJR)

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Optel Report No 16

TELECONFERENCING FOR DISTANCE EDUCATION AND TRAINING: IS THE OPEN UNIVERSITY EXPERIENCE TYPICAL?

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IS THE OPEN UNIVERSITY EXPERIENCE TYPICAL?

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Abstract

The paper surveys the various teleconferencing trials in the Open University, and attempts to analyse why they have been relatively unsuccessful compared to other new media initiatives such as audio cassettes and Computer Assisted Learning. . The situation is placed in the context of British and European educational use of telecommunications in education and training.

Note

This paper is based on a talk given to the conference "Teleconferences in Europe: evaluations and perspectives", held by IDATE at Montpellier, France in March 1985.

Optel Report Series

The "Optel Reports" are a series of occasional papers on viewdata developments in the Open University. For further information contact:

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Introduction

The Open University has been experimenting with teleconferencing systems since 1975, but none of the systems have developed into significant applications within the University. Yet in the same period, the use of audio-cassettes has developed into a major application, and video-cassettes have replaced a significant proportion of broadcast television programmes. For several years, this apparent mismatch between the potential of teleconferencing systems and their actual uptake within the Open University has been the subject of much debate within the small group of educational information technology specialists within the Open University. (1,2,3,4.)

In recent years, several of the group have been involved in similar debates with reference to other British organisations to which they have been consultants or advisors. It was particularly timely that in 1983 we were asked by the Information Technology Task Force of the Commission of the European Community to conduct a study covering the information technology aspects of the education and training "industry" in Europe.(5) This has been a useful way of placing our thoughts about teleconferencing (and information technology) uptake in the Open University within a wider analytic framework.

I would like to discuss some of my conclusions about teleconferencing, rooted in a brief history of Open University developments, but placed in the wider context of distance education and training within Europe. The views I express are my own, and not necessarily those of the Open University or the Commission - however, I believe that several of my colleagues share the majority of them.

The Open University has not yet engaged in video-conferencing, so that the discussion will be confined to the teleconferencing areas of :

- audio conferencing
- audio-graphic conferencing
- computer conferencing.

Audio conferencing

Within the Open University, the telephone has been used for tutoring of students on a regional basis since before 1977. There have been a number of attempts to make the somewhat patchy provision of the service more uniform.

Two internal studies have been carried out on the feasibility and costs of developing a nationally-available audio conferencing service for Open University students, modelled on the successful Wisconsin scheme. However, on both occasions the University (and its parent funding agency) drew back from making the final decision.

I shall attempt to draw out the various threads of such decisions (or rather, non-decisions).

Technical factors

It has always been a mystery to many in the business of data communications that the construction of workable audio conferencing networks seems to have as much to do with "black magic" as with engineering. There are three main technical problems:

- poor quality, and high variability in quality, of the speech network;
- a lack of well-designed loudspeaking telephones;
- a lack of good quality teleconferencing bridges.

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Cost factors

Until a few years ago, most Open University staff had a very inadequate perception of the cost trade-offs of telephone versus face-to-face tuition. The situation has markedly improved now, thanks to the impact of major studies such as that by Robinson.(6) The two main obscuring factors were;

- the location of the students when attending the teleconference, whether home or study-centre;

- the difference betwen the total costs of the teleconference (e.g. including student travel) and that part paid by the University.

Educational factors

Both the educational advantages, and the tutor attitudes preventing wider take up have been well documented, for example by Robinson. In particular she identifies the need for effective training of students and staff in the use of the medium.

Analytic interlude

Some of the issues mentioned above are aspects of more general educational issues.

The location of education

The Open University is a distance-teaching organisation, and yet not all of the educational activity takes place in students' homes. A number of our courses require attendance at a "summer school" (a one-week residential course in the summer); and virtually all courses provide tutorials which take place at "study centres". There are about 260

...ny centres, spread throughout Britain: they provide locations at ...hich to hold tutorials, and also provide computer terminals for use by ...pen University students.

...espite this structure of non home-based educational venues, the Open ...niversity is curiously (perhaps unavoidably) ambivalent about their ...ole, although the details of the debate rarely break out into print. ...or example, some regions provide audio conferencing at study centres, ...thers provide it to students at home, with no very clear reasons for ...he differences in approach. As another example, every course requiring ...ubstantial practical computing activity has been unhappy about computer ...se being restricted to study centres, and computing courses are now ...providing (or expecting students to provide) microcomputers for use at ...me (sometimes stand-alone, sometimes as terminals, depending on the ...rticular course).

...y personal view is that the study centre network will gradually decline ...n size, and become less and less important to the average Open ...niversity student, over the next 10 years.

...e costs of education

...he Open University prides itself on its "openness", and that includes ...eing open to students in different financial circumstances. Several ...onsequences flow from this.

...ees The British authorities have for the past few years insisted that ...he Open University put up its course fees at more than the rate of ...nflation. This has made the Open University increasingly reluctant to ...dd further costs on to the student, e.g. large fees for attendance at ...ummer schools.

...quipment However, the general financial difficulties affecting the ...pen University (plus to some extent the rapid change in technology)

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have made it necessary for certain courses to "deem" that students already have items of equipment. We have always effectively assumed that students had television sets. Now that many courses use audio-cassettes, we assume that students on such courses will have cassette players. Likewise for video cassette recorders or calculators, where they are required.

Alternatives However, the Open University is wary of making such requirements compulsory, as it fears that this would be regarded by students as an explicit increase in the course fee. Hence, it usually makes some alternative arrangements, ususally at study centres, in order to claim that students without the necessary equipment can have access to it. For example, when the Open University first introduced video cassettes, it provided video cassette players in study centres as a fall back - however, few students used them.(7)

Telephone charges The Open University is less worried about adding costs to students if these are not likely to be perceived by students as related to their studies (perhaps because they get lost in non-controversial household budgets). So for example, the Open University has no incentive to increase the number of study centres just so that average student travel costs to tutorials decrease. But an interesting test case is provided by telephone charges, a particularly sensitive item in British household budgets. By moving audio conferencing from study centres to homes, the University could avoid paying the telephone bills (apart from some set-up charge): however, the charging regime for bridges does not always permit this, as the total charge is often levied on the organisation who sets up the call.

Terminals A clearer example is provided by home terminals. On the Software Engineering course, the students are provided with a home computer terminal and modem, but are responsible for paying their own telephone bills. This provides a major saving on telephone bills for

the University. Thus there is little incentive for the Open University to invest in data network equipment to further reduce the student telephone costs.

Audio-graphic conferencing

Since 1975 the Open University has been conducting experiments with telewriting, i.e. the transmission of handwriting over telephone lines. This activity was carried out in partnership with Aregon from 1979-81; from 1982 onwards Aregon took over the main responsibility for the product development and marketing.(8)

In early 1981 a pre-production telewriting terminal called "Cyclops" was available in limited quantities. The Cyclops terminal was a dual-standard videotex terminal with the following features:

- Prestel emulation
- alpha-geometric videotex (somewhat similar to the Canadian Telidon system)
- 8-colour or monochrome options
- light pen
- optional graphic tablet, keyboard and cassette player.

Cyclops trials

From 1981-82 the Centre for Visual Telecommunications at British Telecom Research Laboratories funded a two-year evaluation of audio-graphic conferencing using Cyclops. Some 20 Cyclops terminals were installed as part of purpose-built audio-graphic conferencing workstations in study centres spread throughout the East Midlands region of England. The results after two years were encouraging enough that we continued the trial for a third year (1983) with some limited support from British Telecom. However, at the end of 1983 the trial service was shut down.

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The technical and educational aspects of the Cyclops trial have been well documented.(9,10,11) I will concentrate here on the reasons for the lack of uptake by the Open University after the trial.

Analysis

As I have stated in a previous paper the Open University "relies heavily on high-volume publishing and educational television to achieve its educational ends: thus live human teaching (whether face-to-face with students or via telephones or Cyclops) is a marginal and add-on activity".(12) Hence there is always a cheap alternative to tutoring, namely the "not bothering" option! But one can carry out the analysis at a deeper level.

To begin with, the running costs of Cyclops were twice that of an audio conference since the Cyclops audio-graphics workstation used two telephone lines (one for speech, one for Cyclops data): thus in effect one was running two audio conferences simultaneously. Thus Cyclops suffered in double measure from the worries on costing which were already inhibiting the uptake even of simple audio-conferencing.

You may argue that there was the technical possibility of producing a "one-line modem" (for multiplexing the speech and data). This would have cut the running costs, but at the price of a heavy up-front development cost for a small market, let alone the tortuous problems of getting British Telecom approval for such a non-standard beast. (This was 1983, remember; things are a little easier now.)

There was another argument. One of the original reasons for introducing Cyclops was to bring tutorials nearer to students. In the East Midlands region, a typical student on a higher-level course (of about 200-300 students nationwide) would not have any tutorials at his "local" study centre but would have to travel to one even further away

to attend a tutorial. Not surprisingly, attendance at tutorials was low. By using Cyclops, he could "attend" a tutorial by going to his local study centre.

Unfortunately, this did not help the attendance figures: in general, students were no keener to attend Cyclops tutorials near by than they were to attend live tutorials further away. Part of the problem was no doubt due to the poor ambience in the evenings at many study centres, with the buildings largely unoccupied; however I believe that the main part of the problem is due to what some have called the "armchair syndrome".

This states that if a student is sitting in his armchair at home considering whether to go to a tutorial, the main decision he makes is whether to go out of the house - once he is outside, it is not so important how far he has to drive.

The armchair syndrome is highly relevant to the question of the "correct" number of study centres that the Open University should have. It seems that even if we were to have many more than 260, the attendance at them would not increase. (The more study centres, the less students at any one centre; and being a sole student at a study centre is not a popular option.) Some people believe that the armchair syndrome ceases to apply when the study centres get really close to students, e.g. if each local school were a study centre. There may be some evidence for this from the success of local evening classes in many parts of Britain.

Others argue that the students who do not attend tutorials are making a correct educational decision, given the peripheral nature of the tutorial system in the Open University. Indeed several authors go further, pointing out the Open University's teacher-dominated, centralised, pedagogic approach rather than the "andragogic" approach favoured by a newer generation of adult education theorists.(13) This theme will surface again when we consider computer conferencing.

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Computer conferencing

A computer conferencing system is a sophisticated type of electronic mail system with management facilities which make it particularly useful to support groups of users working together on joint tasks, such as drafting of manuscripts or being engaged in a tutorial.(14)

Since 1982 the feeling has been growing in my mind that the computer conferencing approach may be the best one for the Open University tutorial system in the longer term.(15) My early thoughts were very much influenced by what I heard about US trials of computer conferencing in the educational arena. However, this type of system was not really a completely new departure for us: as usual in the Open University there had been a long gestation period.

The Open University has had since 1976 a large amount of mainframe computer power available for teaching and teaching-related activities, plus a network of about 300 hard copy terminals in the study centres linked to the mainframes by dial-up modems. This computer power has largely been used for the teaching of computing, but a considerable fraction of the power has been devoted to Computer-Assisted Learning.(16) However, since 1977 a number of us have been interested in using our mainframe computer power for database access and messaging. For historical reasons particularly relevant in Britain, this early interest was directed to viewdata.

The Open University decided in principle to develop a viewdata system in 1978; i.e. even before the Prestel public service had started. By June 1980 a trial system was ready and by June 1981 a second release was available which behaved very like Prestel but with an extended set of facilities such as keyword search.(17) During 1982-83, a more sophisticated system was developed giving access by videotex terminals to many of the common facilities on our mainframe, such as the filing system and, not least, our electronic mail system.(18)

In 1982 it became clear that we needed to gain some field experience with computer conferencing, or at least with electronic mail. We already had a good electronic mail package with considerable use on campus, but no significant number of our students had terminals.

Fortunately (but not entirely by accident), we heard that the British branch of the UCSD Pascal User Group were looking for a "lookalike" of the American Telemail package which some of them had been using. We agreed to provide them with a trial service and this has been running since that date. Although it is not computer conferencing, the mail system we use (Mail Manager on Dec-20) is extremely powerful and has bulletin board facilities, and we have also added a number of service functions to round out the package. Certainly, we feel that the experience is relevant.(19)

Analysis

The benefits of computer conferencing do not need spelling out by me in this article: others more expert in the field can do so.(20) However, there are still problems of takeup. Currently the Open University is struggling with the decision as to which microcomputer it will recommend students to buy: it has been agonising over this decision for two years. Only one course at present has microcomputer terminals; in 1986 two more courses will have microcomputers (but only one of those will have modems supplied). Thus again we are working at the margins: even if a course can deem that students have the recommended microcomputer, it will have to supply modems if it wants the students to use computer conferencing. (And this is to ignore the cries of those who say that the students need printers and disc drives as well!)

Even if the students have the microcomputer terminals, another objection is raised: the computer conferencing will "waste" the computer's power! Interestingly, this view that the computer is "too precious to waste" on

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a new application, was an undercurrent for many years among the critics of Computer Assisted Learning in the Open University.

One constructive lesson can be learnt from this, which is one accepted by all the educational information technologists at the Open University. It is futile to graft a new medium on to an existing course structure and presentation method: one has to design the course from scratch to incorporate the new medium. But if one's judgements of the new medium are incorrect, what happens to the course? Following this argument, many of our cautious administrators and managers say "You should wait until everyone else has done it"!

There is a final point concerning terminal-based systems in particular. Once the home terminals are in place, whether for teaching computing or for computer conferencing (or Computer-Assisted Learning), it makes good economic sense to use them for other applications such as administration (registration, student records, fees) and assessment. Needless to say, there are obstacles here too: a technical one is that all our administration and assessment runs on a completely separate mainframe (from a different manufacturer) which does not yet support asynchronous terminals accessing the main administrative systems.

UK perspectives

There is very little use of teleconferencing in British education and training. In particular, I do not know of any use yet of computer conferencing systems or of slow-scan video, in the support of courses. Audio teleconferencing is being used to a limited extent, but there are no great signs of growth. Audio-graphics systems have been used only at the Open University during 1981-83, and more recently on the Plymouth Polytechnic system (PACNET).

The British interest in communications in education focuses on videotex, and to a lesser extent on electronic mail. Even these systems are used

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mainly for educational administration functions, e.g. databases of courses or messaging between schools and administrators, rather than being oriented to teaching.

Analysis

There are several reasons for the above situation. Interestingly, the balance is changing.

Cultural factors There appears to be something in the British character (or at least the character of those in authority) that instinctively favours centralised one-way delivery systems such as broadcast television and teletext. Some people say that the ghost of Lord Reith still walks the land. Other interesting pointers are the lamentable saga of the early years of Prestel as a centralised and nearly one-way system, and the long rearguard action by the Home Office against citizens band radio.

Cost of communications The cost of "long-distance" phone calls is high and there is no likelihood of a rapid significant decrease in these: one or two percent a year in real terms is all that we can expect. However the cost of data communications is falling rapidly as the public data networks and private Value Added Networks (VANs) spread their coverage. As an example of this, in 1983 I observed that British data networks were fairly poor: in particular that the public data network PSS had limited coverage and a poor user interface, and that the public videotex network Prestel Gateway still had limited coverage although promising a lot better.(21) Since then things have got better; in particular:

- Prestel Gateway has excellent 92% local call coverage (but still limits you to videotex terminals);

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- PSS is about to offer Multistream services with good user interface and high local call coverage;

- not to be outdone, various VANs such as Istel are now offering local call coverage aiming towards the 90% level.

The spread of data networks should be a worry for the devotees of audio conferencing. Oversimplifying a little, a speech channel requires 64000 bits/sec of digital capacity, whereas a data channel (e.g. for electronic mail) requires only 2400. Even allowing for some improvement in the efficiency of speech compression, speech requires about 10 times as much bandwidth as data, and so is likely to have tariffs considerably higher than those for data. Already in the UK one can buy daytime dial-up data service for about £5/hour (local phone charge plus network charge) as compared to £15/hour for a long-distance phone call.

Organisational problems Given the previous factors, it is not surprising that when combined with a number of organisational weaknesses in the education sector, little progress has been made with the use of telecommunications in education. These problems include the fragmentation of the educational sector, and a general mistrust of new technologies. (As one commentator said to us: "Many of my colleagues are still learning to use an overhead projector".)

Some would argue that the relative success of Computer Assisted Learning is a counter-example to the above gloomy thoughts, but I do not think so. Firstly, since the days of the National Development Programme, CAL has been the subject of a great deal of marketing by educational technologists to a (largely uncommitted) wider education audience: despite this, its penetration is still low. Secondly, CAL appeals to the fissiparous isolationist mentality of many teachers, exemplified by the remark: "What kind of IT do I what? Give me a microcomputer linked to a video disc and I'll be happy". Thirdly, the lack of

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awareness of the effort and costs involved in courseware authoring is typical of an "industry" trying to ignore questions of cost-effectiveness. (Unfortunately, recent government initiatives such as the Microelectronics Education Programme have done little to correct this third problem; indeed rather the opposite has been achieved by their "primitivist" approach to software development.)

Geographical factors The dominance of London in British business life and the relative closeness of other major business centres to London has undoubtedly been a factor inhibiting the growth of teleconferencing in UK business. I do not think that this analysis holds true for education, given the geographically widespread nature of the industry. But of course there is a lack of interest in collaboration.

Time factors A factor which undoubtedly is relevant is that educators (or at least their employers) do not value their time - if you do not believe this, try putting in an expenses claim for taxi or air fares to most British educational bodies. (Even the motor car is often frowned on as a needless luxury.)

European perspectives

Most of what I wrote in the last section for Britain holds true for Europe generally, with the exception of the geographical remarks. But here, I think, the multiple languages of Europe cause a problem. It has been argued that for non-native speakers of a language, the bandwidth available on the telephone network is the minimum acceptable for intelligibility. According to this argument, the PTTs of Europe should adopt a higher-quality digitisation of speech than the one adopted for the emerging Integrated Service Digital Network (ISDN). This will, alas, not happen as a standard, but it may, just may, be offered as a premium service.

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One distinction between non-British European educators and the British is that the non-British educators are even less interested in telecommunications than the British. This is surprising, given the significant interest in videotex in, say, France and Germany. It may have something to do with the fact that in Britain the PTT took a major role in promoting a database rather than just a service; that strategy is now widely agreed to have been misguided, but it was probably what education needed to "get it going".

Future perspectives

There are, of course, some technical developments which will improve the somewhat gloomy picture I have painted. But they will not improve the picture by much. This may seem surprising, given that many of you will have read the predicitions of futurists such as Toffler and of educational thinkers such as John Robinson.(22,23) But it is a weakness of many educational thinkers that when they come to consider new technology, they get seduced by the gadgets rather than considering the real questions of service coverage and service cost. This leads them into at least two errors:

a they imagine that new services such as videoconferencing with audio return channel are "just around the corner";

b they postulate new services such as databases, which could in fact be run <u>today</u> were it not for some non-technological factors such as the lack of (inter)national argreement on classification schemes.

There is relatively little publicly available on future telecommunications forecasts, and very few serious papers on the educational use of future telecommunications services.(24) Thus I hope that the following contribution will be useful.

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A 1992 scenario

In 1992, most business customers (including schools and colleges) will be served by the ISDN, i.e. a digital phone connection offering speech plus 64 000 bits/sec data. A few business customers will be served by two-way video services, mostly delivered via satellite. Rather more will have 1 000 000 bits/sec digital connection into the phone network. Residential users will still be largely served by analogue phone lines, but about 25% of them will be passed by cable systems, some of which will be interactive.

Thus an organisation which offers a "universal" distance education service to home users in 1992 is still restricted to essentially the phone network as we know it today. However, there are two alleviations. First, since many of the exchanges will be digital, the general quality of phone circuits will be higher. Second, and more importantly, customers will be able to use the "final generation" of analogue modems; the exact speed of these modems is still unclear, but will give at least 2400 bits/sec error-checked communication. (Compare this with the 1200 bits/sec unchecked communication we use at present.) At this speed, computer conferencing will work well, as will delivery of full-text documents in character form with limited diagrammatic graphics, or indeed telewriting; however, it is too slow for facsimile delivery of documents.

It is just possible that the "final generation" of modems will offer 9600 bits/sec; if so, photographic-style image transmission (facsimile, slow-scan, alpha-photographic videotex) becomes just feasible. This is an interesting service discontinuity, and we shall not know until nearer the time which way it will go.

Organisations who wish to offer distance education to business sites or schools will have an easier task. They will be able to offer a variety

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of good-quality teleconferencing services including high-grade audio-conferencing and slow-scan; as well of course as computer conferencing with effective pictorial support.

There is a second service discontinuity worth mentioning. It is just possible that technology will advance sufficiently to produce a reasonably naturalistic moving video conference system over the 64 000 bits/sec ISDN. The image compression equipment to do this will be expensive, and will only be cost-effective if used for much of the day; however the cost advantages to education in Europe of running video-conferencing over normal grade digital links would be considerable.

A year 2000 scenario

By the year 2000 I would expect that all customers (residential or business) would be connected to the ISDN. There will also be a broadband network delivering 1 000 000 bits/sec data to business users, multiple one-way video channels to all urban premises, and video telephony to larger business and high-status urban homes.

Thus distance education organisations will be able to use audio teleconferencing and slow-scan services on a universal basis. However, full-motion video conferencing will only be available to business premises (using compressed video at the 1 000 000 bits/sec rate), and probably to most colleges.

Document delivery will be available to every home, and I would expect by this time that most "printed" distance education material will be distributed over the ISDN.

Analysis

The inescapable fact is that telecommunications networks evolve fairly slowly; in particular it takes a long time for a previous generation of

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equipment to be replaced and so raise the general level of service. Hence a distance education organisation wishing to use new information technologies like the various versions of teleconferencing has a harsh choice:

a) if it believes firmly in open-ness, it will have to wait until the new service is widespread (note that the cost pressures on education rarely allow any duplication of service on different media);

b) if it is prepared to target a specific audience who in addition to an education/training need have a particular socio-economic or geographical profile, it can use advanced technology, but at the risk of constricting its market and attracting "social" criticisms (internal and external) of divisiveness.

Thus it is likely that the "educational" organisations most likely to use new telecommunications technology are those with a training rather than an educational brief, who are prepared to concentrate on training at the workplace rather than on training at home (note that the workplace, being a business, is better served by telecommunications technology). These more innovative, more targeted, training organisations are liable to "skim the cream" off the training market, leaving the less advantaged customers to the traditionalist distance education organisations. Suppliers of teleconferencing systems should draw the obvious conclusions as to where in the education and training "industry" their best market lies.

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References

1. Bates, A.W. et al (1984) The Role of Technology in Distance Education, Croom Helm

2. Bates, A.W. (1984) Selecting and designing low-cost media for distance education, Ziff Papiere 53, Fern Universitat

3. Sharples, M, (1982) Educational Technology and the Open University, Teaching at a Distance 22, pages 15-20

4. Bacsich, P.D. (1984) Videotex in Education: the British situation, Proceedings of Videotexto 1984, Sao Paulo

5. Zorkoczy, P.I. et al (1984) Opportunites for Information Technology-based advanced educational technologies, ITT-TF, European Commission

6. Robinson, B. (1981) Telephone tutoring in the Open University: a review, Teaching at a Distance 21, pages 57-65

7. Brown, S. (1984) Video Cassettes, in: Bates, A.W. (editor) The Role of Technology in Distance Education, Croom Helm

8. Bacsich, P.D. (1982) Audio-videotex teleconferencing, Proceedings of Viewdata 82, London

9. Sharples, (1982) op cit

10. McConnell, D. (1982) Cyclops telewriting tutorials, Teaching at a Distance 22, pages 20-25

11. Sharples, M. and McConnell, D. (1983) Report on The Open University Cyclops telewriting trial, British Telecom

12. Bacsich, P.D. (1984) op cit

13. Jarvis, P. (1981) The Open University unit: andragogy or pedagogy, Teaching at a Distance 20, pages 24-29

14. Cross, T.B. (1985) Computer teleconferencing: new electronic management, Oxford Surveys in Information Technology 1, pages 215-243

15. Bacsich, P.D. (1982) Optel and Cyclops: a status report, Optel Report 13, Open University

16. Jones, A. (1984) Computer Assisted Learning in Distance Education, in Bates, A.W. (editor) The Role of Technology in Distance Education, Croom Helm

17. Bacsich, P.D. (1981) The Open University Viewdata system, Proceedings of Viewdata 81, London

18. Bacsich, P.D. (1983) A Videotex Operating System, Proceedings of Viewdata 83, London

19. Bacsich, P.D. (1985) Computer conferencing in distance eduction: will it work in the UK? in Jones, A. et al (editors) The Computer Revolution in Education: Volume 1 - New technologies for distance teaching, Harvester

20. Cross, T.B. (1985) op cit

21. Bacsich, P.D. (1985) op cit

22. Toffler, A. (1981) The third wave, Collins

23. Robinson, J. (1983) Opportunities for lifelong learning in the 1990s: an optimistic view of information technology, Association for Recurrent Education - occasional papers 1

24. Cowie, J.B. The future of education in the light of media changes, Institute of International Communications 1983, Aruba